DESIGN – BARRIERS
LOCATION, DESIGN, MANAGE

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Expertly Engineering Safety From Fire
OBJECTIVE

• Identify the different types of barriers used in health care facilities

• Identify the key characteristics for each barrier
  ▪ Continuity
  ▪ Protection of openings

• List at least three strategies that can be used to improve a barrier management program
Types of Wall Assemblies

- Exterior walls
- Fire walls
- Fire barriers
- Fire partitions – No such assembly in NFPA
- Smoke barriers
- Smoke partitions
FIRE TESTED WALL ASSEMBLIES

• In accordance with ASTM E119/UL263
• Resist passage of heat and hot gases
• Structural integrity during the test fire
• Have something left at the end of the test
FIVE POINTS

- Required fire-resistance rating
- Continuity
- Openings and penetrations
- Types of materials
- Structural robustness
• Fire barriers are used in the following applications:
  - Fire area separations
  - Mixed occupancy separations
  - Incidental use areas
  - Hazardous area separations
  - Exit enclosures
  - Shaft enclosures
  - Horizontal exits
  - Corridor walls – NFPA only
CONTINUITY

FIRE RESISTANCE RATED FLOOR/CEILING ASSEMBLY

FIRE BARRIER

NON FIRE RESISTANCE RATED FLOOR/CEILING ASSEMBLY

FIRE RESISTANCE RATED FLOOR/CEILING ASSEMBLY

FLOOR OR ROOF DECK

FIRE RESISTANCE RATED FLOOR/CEILING ASSEMBLY OR ROOF/CEILING ASSEMBLY

FIRE BARRIER

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SUPPORT

• Supported by construction with the same fire-resistance rating as the fire barrier

• Some exceptions
  ▪ Vary between NFPA and ICC
# SUMMARY OF FIRE BARRIERS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>Depends upon specific use</td>
</tr>
<tr>
<td>Required continuity</td>
<td>Floor/ceiling below to deck above</td>
</tr>
<tr>
<td>Openings</td>
<td>General: Aggregate glazing area (or width) &lt;25% wall area/length; maximum size 120 sf. Specific: Rules based on use of barrier</td>
</tr>
<tr>
<td>Types of materials</td>
<td>As required for the type of construction</td>
</tr>
<tr>
<td>Robustness of structural system</td>
<td>If load bearing, fire tested with load</td>
</tr>
</tbody>
</table>
FIRE PARTITIONS

• Fire partitions are used in the following applications:
  ▪ Dwelling units separations
  ▪ Sleeping units in Group R-1, R-2 and I-1
  ▪ Tenant separation in covered malls
  ▪ Exit access corridor walls
  ▪ Elevator lobby separation

• Remember, NFPA does not use this phrase
## SUMMARY OF FIRE PARTITIONS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>1 hour, with exceptions, depending on use. For corridors see Table in Chapter 10 – IBC only</td>
</tr>
<tr>
<td>Required continuity</td>
<td>Floor/ceiling below to deck above or tight to underside of fire-resistance rated assembly. Supported by fire-resistance rated construction, except in corridors, tenant, and guestroom separations in Types IIIB and VB construction</td>
</tr>
<tr>
<td>Openings</td>
<td>20 minutes (w/o hose stream) for corridors 45 minutes for all others</td>
</tr>
<tr>
<td>Types of materials</td>
<td>As required for the type of construction</td>
</tr>
<tr>
<td>Robustness of structural system</td>
<td>If load bearing, fire tested with load</td>
</tr>
</tbody>
</table>
• Smoke barriers are used in the following applications:
  ▪ Group I-2
  ▪ Group I-3
  ▪ Areas or refuge
  ▪ Other specific applications
# SUMMARY OF SMOKE BARRIERS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>1-hour with the exception that a construction of a minimum 0.1” thick steel in Group I-3 buildings is allowed</td>
</tr>
</tbody>
</table>
| Required continuity                   | Horizontal: Outside wall to outside wall  
                                      | Vertical: Floor to slab or deck above, continuous through interstitial spaces  
                                      | Supporting construction may be required based upon the applicable codes |
| Openings                             | 20 minutes – but not a true fire door in NFPA 101  
                                      | Smoke- and draft-controlled doors tested in accordance with UL 1784 – IBC only |
| Types of materials                   | As required for the type of construction                                     |
| Robustness of structural system      | If load bearing, fire tested with load                                       |
Smoke partitions are used in the following applications:

- Corridor walls in Group I-2 – IBC only
- Sprinkler protected hazardous areas – NFPA
## SUMMARY OF SMOKE PARTITIONS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>Not required (unless otherwise required)</td>
</tr>
<tr>
<td>Required continuity</td>
<td>Floor/ceiling below to deck above or tight to underside of ceiling membrane designed to limit passage of smoke - Difference between NFPA/ICC for ceiling tiles</td>
</tr>
<tr>
<td>Openings</td>
<td>Windows: Sealed to resist free passage of smoke</td>
</tr>
<tr>
<td></td>
<td>Doors: No louvers</td>
</tr>
</tbody>
</table>
|                                    | Air leakage rated (UL 1784) – IBC???
|                                    | Self closing, or automatic closing by smoke detectors                        |
| Types of materials                 | As required for the type of construction                                    |
| Robustness of structural system    | If load bearing, fire tested with load                                      |
LS DRAWING INFORMATION

- A legend that clearly identifies features of fire safety
- Areas of the building that are fully sprinklered (if the building is partially sprinklered)
- Locations of all hazardous storage areas
- Locations of all rated barriers
- Locations of all smoke barriers
- Suite boundaries, including the size of the identified suites—both sleeping (max 5,000 sq ft) and non-sleeping (max 10,000 sq ft) – CMS Memorandum dated August 30, 2013
- Locations of designated smoke compartments
- Locations of chutes and shafts
- Any approved equivalencies or waivers
SUCCESSFUL STRATEGIES

• BUILD IT CORRECTLY
  ▪ Thorough plan review process
  ▪ Contractor qualifications
  ▪ Commissioning systems and buildings
    o NFPA 3, NFPA 4, ASHE documents, pending ICC std.
  ▪ Complete SOC documentation while contractor still on site
  ▪ Use of certified inspectors or special inspectors
BUILD IT CORRECTLY!!
SUCCESSFUL STRATEGIES

• Make sure all rehabilitation work is done correctly
  ▪ Refer to previous slides
• Above ceiling work permits
  ▪ Means to identify “approved” individuals
• Proper identification
  ▪ Labels
  ▪ Marking
  ▪ Life Safety Drawings
ADDITIONAL RESOURCES

• Visit [www.koffel.com](http://www.koffel.com) for links to a LinkedIn Life Safety Code Discussion Group

• NFPA
  - [www.NFPA.org/###](http://www.NFPA.org/###)

• ASHE

2013-2014 TEAM MEMBER
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